CONSCIOUSNESS AS A SET OF INFORMATION AND QUANTUM PROCESSES IN THE BRAIN

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Abstract: *All the material presented in this thesis as well as the author's implications prove that a living organism can be perceived as a complex electronic device similar to technical devices, whereas biological materials (proteins, DNA, RNA) - as components of electronic devices. These arguments allow us to state that a biological system can be considered to be a quantum computer that functions on the basis of entangled quantum states and optoelectronic phenomena. Melanin and neuromelanin are involved in the central control of all biological, physiological and psychological processes. Numerous modular communication systems and signaling pathways that transmit signals into cells are generated under the influence of light. Melanin and neuromelanin function as a multireceptor of a full range of electromagnetic, acoustic, soliton waves, torsion fields and bioplasma which does not receive so much information as the senses do, but receives it constantly. The role of photoreceptors, receptors of hearing and touch is limited to a single reception of a stimulus, whereas melanin and neuromelanin play an integrative function, combining stimulus elements in a whole, namely movement with space and time, sound with light, space and time.*

Key words: bioelectronic processes, bioplasma, biocomputer, consciousness, perception.

1. BIOELECTRONIC MODEL-ITS ROLE IN PERCEPTION AND MENTAL PROCESSES

L. Bertalanffy formulated the concept of a living organism as an open system that collects and gives back material substance, and maintains a constant value of mass relationships within a continuous variation of material components, energy and information in a continuous flow between the body and the surrounding environment (Bertalanffy 1976).

Therefore, the principal feature of the living world is the organization of structures filled with mass and energy as an information carrier. Information is in fact defined

as the ability to organize the system or maintain it in an organized state, while energy is defined as the ability to perform work (Latawiec 1995: 38).

Human life is not just a matter of biology and biochemistry; it also constitutes a cybernetic-information and bioelectronic structure, which has an impact on health, disease and human behaviour. This bioelectronic structure creates a "*homoelectronicus*" with its electronic personality. In this new bioelectronic paradigm one can notice quantum psychology and human cognition in terms of quantum processes occurring in the biological system, which is understood as a bioelectronic device that processes, stores and manages information. A quantum individual is the same individual as an anatomical and physiological one, but living in the world of quantum dimension. In addition to the traditional, well-known biochemical reactions occurring in living organisms, a new reality is opened for science that functions on the basis of a model of bioelectronic life. This model shows that the particles that determine the molecular substrate of biochemical reactions are also a manufacturer of biological structures, such as proteins, melanin, nucleic acids, bones, etc., which are an electronic material having piezoelectric, pyroelectric, ferroelectric and semiconductor properties (Sedlak 1977: 156).

Apart from using biochemical channels, the human biological system, in order to transfer information uses electromagnetic, acoustic, soliton waves; electric, electromagnetic and torsion fields as well as bioplasma. This communication is applied not only in biological processes, but also in all mental functions. Control of the human biological system is accomplished by a grid of information channels: electron, photon, phonons, soliton, spin, ionic and bioplasma. Each of these channels may in itself be a carrier of information to a biological system, or it can function as a team in the bioplasma system (Sedlak 1980).

The biochemical model explains the mechanism of mental life in an abstruse manner. The transmission from inanimate matter to living matter has yet to be explained. It still cannot explain the nature of consciousness and the transition from inanimate matter to living one. Where is the threshold and what is the role of biochemical processes in consistency of soma and consciousness as well as in building a mental structure? The author supports the propositions that the nature of mental processes is inexplicable as far as interactions of biochemical processes are concerned and it is much easier to describe it in the light of quantum processes (Adamski 2006: 70).

2. BIOELECTRONIC PROPERTIES OF BIOLOGICAL STRUCTURES

Studies on the electronic properties of biological structures in various research centres have shown the following: Piezoelectricity for amino acids, proteins, collagen, keratin, elastin, actin, myosin (Fukada 1974: 125), (Fukada, Yasuda 1964,), as well as for tendons (Athenstaedt 1974, muscle (Fukada 1970: 846),

blood vessels (Fukada, Hara 1968: 779), DNA (Fukada, Ando 1972: 567), bone (Yasuda 1954: 268), (Lang 1966: 705), (Shamos, Lavin 1963: 87), (Athenstaedt, Claussen, Schaper 1982: 1019), neural tissue (Athenstaedt 1987: 459). (Giuzelsu, Akcasu 1974).

In living organisms, in addition to piezoelectrics and pyroelectrics, also biological semiconductors were found to exist. Semiconduction occur in materials with an ordered internal structure, such as crystals (Nye 1962: 134). Rozenberg (1962) and Bardelmeyer (1973) announced, on the basis of their research that collagen at water content of 10% shows electron conduction. In addition, there is also the proton and ionic conductivity. Nucleic acids were also studied in terms of semiconducting and phot-conducting properties. Eley (1972) and Suhai (1974) carried out conductivity measurements on dry nucleic acids. The amount of activation energy they received ranged from 2.5 eV to 2.7eV. Liang and Scalco demonstrated the phenomenon of photoconductivity in DNA, and adenosine. Thermal energy activation of photoconductivity ranged from 0.90 eV to 1.18 eV (Liang, Scalco 1963: 1326).

Semiconducting in amino acids, proteins, muscle fibres was also demonstrated (Cope 1975: 32). Thanks to semiconductor properties of proteins and melanin, electrons can travel over long distances without losing energy. Ion currents expire at short distances because ions are much larger than electrons. In semiconductors the electron energy of the protein would be preserved and passed on as information. In terms of bioelectronics, the background of bio-communication in the human biological system may be an electromagnetic wave, electronic and acoustic, the latter resulting from biological piezoelectric electrostriction. Piezoelectric phenomenon consists in changing mechanical energy into electrical energy, together with electricity an electric field is created (Krajewski 1970). A piezoelectric placed in an alternating electric field is deformed and generates an acoustic wave. This phenomenon is referred to as electrostriction or quantum-acoustic effect. The ability of piezoelectric crystals to polarize at the expense of mechanical interaction and ability to deform at the expense of electric fields allows us to consider them as electromechanical transducers. (Krajewski 1970: 59).

Piezoelectric properties were acquired by each organism at the moment of its creation on earth and these properties are required to run bioelectronics processes that are necessary for the functioning of organisms. These processes occur throughout the body, but are especially noticeable in the following systems: cardiovascular, musculo-skeletal while walking and exercising, breathing, mechanoreception, baroreception, sense of hearing, as well as during sexual arousal, etc. Among these systems or senses, the stimulating role is played by mechanical, hydrostatic and acoustic energy, which polarizes bio-logical piezoelectrics, and thus they become carriers of information in the form of electrical field and the acoustic wave for the biological system.

Shamos and Lavin (1963: 92) carried out detailed measurements of piezoelectric effects in human long bones while the subjects were walking and mechanically leaning, and these activities generated an electric field. The body needs this filed to:

- activate the enzyme function and communication (Shimomura 1991: 57);

- record perceptual experience in the brain (Adamski 2006: 99);

- synthesise melanin (Adamski 2005: 31), Cieszyński 1990);

- integrate the biological unit into a hierarchy of cell-tissue-organ-organism, ecosystem.

The high speed of information transfer in living organisms proves that coordination at various levels of biological complexity requires minimal energy requirement but more information (Molski 2005: 209).

3. PHYSICAL-ELECTRONIC PROPERTIES OF MELANIN IN THE HUMAN BIOLOGICAL SYSTEM

Melanin, in terms of its electronic and physical aspects, is characterized by the following features:

A. Donor-acceptor properties;

B. Proton conduction property (Matuszak, 2001: 80);

C. The ability to absorb light of all wavelengths;

D. Properties of photoconductors and amorphous semiconductors (Strzelecka 1982: 227), (Chedekel, 1995);

E. Increased resistance to light and ultraviolet light;

F. Generation of excitable electrons and photons (Nicolas 1997);

G. High oxygen demand (Prota 1993: 79); selective vulnerability to phonons - this means that cells containing melanin have the ability to selectively absorbed phonons (Sarna Swartz, 1994: 339);

H. Can fulfil the function of phonons photon transmitter and vice versa (McGinnes, Corry Proctor, 1974: 854);

Melanin and neuromelanin absorb and convert electromagnetic energy in acoustic energy. This process may also occur in the opposite direction, during which the spin fields are produced which solitons are to be found. Solitons are responsible for human unconscious states (Adamski 2013). The transformation of light quanta into an acoustic wave, or a photon into a phonon becomes a carrier of information for psychobiological structures in the human body.

I. Exhibits paramagnetic properties of melanin (Schultz, Kurtz, Wolfram, Swartz, Sarna 1987: 45);

J. Characterized by properties of photoconductivity in pheomelanin (Wilczok 1979).

K. Melanin is a semiconductor, which allows you to transform light into electrical energy. Melanin is also treated as transforming electricity into electromagnetic energy (Bruno, Nicolaus 2005: 794).

L. Melanin is a piezoelectric - under the influence of an alternating electric field emits an acoustic wave. In addition, all melanins of the biological system exhibit diverse physical properties such as absorption, disappearance of light and sound, the binding of organic chemicals, storage of liquids and gases (Bruno, Nicolaus 2005: 793).

Light and electric field are the most important factors regulating the biosynthesis of melanin, the absence of these factors results in the biosynthesis of melatonin. Melanin reduces the amount of free radicals in the biological system. The most important feature is the ability of melanin to absorb light, ability of retention, storage and renewal of energy (Nordlund et al., 1998: 347)

Melatonin provides information on the time of day and the time of year to each tissue. Melatonin functions as an internal clock. Measures time for seasonal phenomena, processes of adaptation and development, for example. Adolescence - melatonin activates sexual drive, directs the process of pregnancy, etc. (Adamski 2005).

Melanin is a piezoelectric semiconductor and it allows one to transform different kinds of energy into electrical energy which is related to electric fields. The effect of an electric field on a piezoelectric produces electrostriction, and this in turn triggers phonons, which is an acoustic wave. The biological system has transducers, which are transform electromagnetic energy into an electrical impulse (eyesight), thermal energy into electricity (pyroelectric- temperature-sense), mechanical energy into electricity and vice versa (the sense of touch), sound energy in electrical impulse (sense of hearing). The biological system in different ways ensures that it has appropriate density of the bioplasma state, thanks to which melanin combines in itself a wide range of fields and elementary particles.

Free radicals play an important role in the process of imprinting information on the nucleus. Free radicals, formed upon irradiation of UV melanin, are able to change settings of nuclear spins, and make a permanent record of information in the nucleus, which is contained in the biological structure (Hu,Wu., 2004: 7).

Free radicals are also responsible for the formation of the quantum states of entangled nuclear particles, or the entire structure of information and images produced in the bioplasma of melanin and neuromelanin. Changing the nuclear spins entails the change of the field strength of the spin or solitons field, which is held responsible for the nature of mental processes. Entanglement is a phenomenon in which there is a combination of two or more objects that are interrelated. In the process of splicing bilateral link between objects occurs, and the first object cannot

be described without taking the other into account. This leads to a correlation between the physical properties of the objects, even when they are apart. This phenomenon is known in the scientific world as the EPR paradox.

The phenomenon of quantum entanglement can occur for a wide variety of micro-world objects, like atoms, elementary particles, or spin-entangled electrons. Entanglement is an instantaneous phenomenon and the distance between objects does not matter.. For example, when two electrons are entangled, the quantum state making changes to one instantly changes the quantum state of the other.. A method of transferring information using quantum entanglement in physics is known, and is based on the schema quantum teleportation and dense coding (Bouwmeester et al, 1997).

Teleportation allows for transferring messages stored in the form of the quantum state of the system, while the dense coding can increase channel capacity through the exchange of quantum information. Since the teleportation scheme can be extended to multiple qubits, it is possible to transmit longer messages in this way. (Barrett et al. 2008).

According to the author, entangled quantum states are used in sensory perception - especially in the sense of sight, but also in the creation of an act of consciousness. When during photoreception light falls on the iris of the eye, which is filled with melanin. Melanin activates free radicals that have an impact on the setting of nuclear spins. Change spins make a record of information in the nucleus, and at the same time entangled quantum states are created, controlled by bioplasma and received in the brain byneuromelanin. Information received by brain neuromelanin is a conscious act that allows humans to function. This mechanism for recording information is of great importance in the transmission of innate knowledge by biological structures. As a result of a newborn switching from placenta oxygen supply to breathing (first breath) oxygen level in arteries increases suddenly, causing oxygen shock, this increasing levels of oxygen radicals. This sudden increase in the level of radicals becomes the initiator of imprinting the current reality in which the infant resides. Melanin in the epithelium of the retina and iris epithelium is formed before birth, during labour, while the child is entering the world, the first eye contact very strongly activates the development of free radicals, which record in the child's biological system information about the surrounding reality and stops further synthesis of melanin after birth in these epithelia. This means that once the information is encoded in these structures, it becomes a benchmark for many biological processes such as mental health, adaptation to the environment, reception of tonality of sound, space and time, emotional state and behaviour of the individual, the formation of consciousness of one’s body. According to the author, melanin and neuromelanin in their electronic structure create a spintronic device, which is necessary for the functioning of sensory perception. This is supported by the following data. In electronics, it is assumed that a spintronic device must include the essential elements: first, spin polarization must be generated, which is an excess of electrons with a particular spin orientation. This can be achieved by transporting

electrons from a material in which permanent polarization exists (that is, a ferromagnetic), or by appropriate optical stimulation, using semiconductor system selection rules. Secondly, it is necessary to be able to control the spin, the easiest way is to achieve this is in semiconductors due to their unique physical properties. The pumping spin problem arises, because the spin polarization is sufficiently unstable in time, hence the important role of controlling the spin relaxation processes (Barnas 2002). (Fabian et al, 2007).

It should be recognized that while melanin and neuromelanin are exposed to light, spins are pumped to bioplasma, which is important for qubit resolution in spin biocomputers. In such computers fuzzy logic is applied. The number of intermediate states depends on the resolution of the computer, and, the resolution value, in turn, is determined by bioplasma density. Melanin controls free radical reduction in a biological system, which results in increasing or decreasing the rate of spins being pumped to bioplasma which is responsible for putting together information as data sequences and strings in biocomputers. In addition to its function of spin pumping, melanin also has the ability to accelerate to decelerate photons and phonons, which is utilized in creating an information language in spin biocomputers.

Spintronics will revolutionize computer design and information processing. Traditional computers carry out calculations by means of controlled flow of electric charges and changes in current flow are information carriers. Spintronics demonstrates that instead of changes in current or in light intensity, information can be transmitted by spin direction (left or right). Unlike in traditional computers, particles can remain in the state of superposition, i.e. their spin can be both negative and positive at the same time. This means that such a particle has the “0” and “1” state at the same time as well as the entire infinite sequence of values in between. The traditional computer adds numbers sequentially (one after another), while a quantum computer can carry out a very large number of mathematical operations simultaneously. A computing machine made of several hundred atoms would be able to carry out billions of calculations simultaneously (Jacak 2001) (Marecki 2002).

4. MANAGING INFORMATION IN A BIOCOMPUTER-LIKE MANNER IN THE HUMAN BIOLOGICAL SYSTEM

Signal transmission in a biological system need not only be effected under the influence of ionic conductivity, electromagnetic wave, acoustic and electric fields or electromagnetic fields; what would be involved here is soliton waves, spin field called nonlocal processes that affect the state of energy and information of human bioplasma and his behaviour (Adamski A., 2005), (Brizhik 2002), (Brizhik 2003).

Solitons are independent entities, solitary high power pulse in motion, which does not blur during contact with another particle, wave, or from the field. There are solitons of light, water and sound, which can strongly interact with other solitons,

but after the impact remain unaltered in the their form and structure, e.g. when two soliton waves are close to each other, they "acknowledge each other's presence" and penetrate each other, but do not impose themselves on each other, and then spread out in the same order in which they came into contact. They just temporarily penetrate each other, without losing their identity. Soliton waves transmit signals without having to move the environment as a carrier wave. Only spatial relations are transferred, i.e. constellation geometry of water and air molecules, without their physical participation –the environment participates as a "spirit" as a structural standard (Brizhik 2003). The author concludes that a biological system can use multiple biocomputers in a single or serial arrangement. Here are a few examples:

Protein biocomputer– the cell membrane is made of a protein and lipid structure. Proteins are piezoelectrics. Proteins contain unpaired electrons that make up free radicals such: a hydroperoxyl radical, hydroxyl radical and nitrogen oxide. Free radicals have the ability to activate spins: electron spins, photon spins, other elementary particles and atomic particles. Activating spins to gyrate to the right or left involves generating a spin field that can be used for binary information recording, spin movement to the left – 1, and to the right- 0 (Hu, Wu 2002, 2003).

Protein biocomputers in biological membranes make up a biointernet network, they are supplied with power by an electric field generated during the piezo- and pyroelectric. In such biocomputers, the role of an information carrier would be performed by an acoustic wave created during the piezoelectric electrostriction, and a soliton wave generated by spin gyration, brought about by free radicals and Bose – Einstein condensate (Adamski 2015), (Shipov 1995, Shipov 1993).

DNA biocomputer - in 1953 Watson and Crick discovered that DNA was composed of a double helix and contained sugar, phosphorus and bases: pure bases – adenine (A), guanine, (G), and pyrimidine bases – cytosine (C) and thymine (T). In DNA information is recorded in four-letter language (Crick 1996: 88).

The DNA structure constitutes a matrix for protein synthesis, base sequences in DNA are used to code amino acid sequences in appropriate protein in order to replicate DNA. Polymerase and the four-letter language determine the structure of the DNA computer (Lewiński 1996: 153).

Albert Popp demonstrated that DNA emits laser light within the 200 nm - 800 nm range (Popp 1983).

The DNA biocomputer is powered with electricity generated by the piezoelectricity and makes up a biointernet network in which laser light and acoustic waves are information carriers.

Melanin biocomputer – it is the author's opinion that melanocytes contained in skin, hair follicles, in eyes, in ears, nerves, in substantia nigra and meninges are responsible for maintaining the structure of melanin biocomputers. The melanin synthesis process is determined by light, temperature and electric fields (Adamski 2005).

Melanin exhibits the ability to change light into acoustic energy, i.e. photons into phonons and the other way round. Melanin directs light, can speed it up or slow it down. Melanin can also transform light into a torsional field (informational), determined by the spin movement. In dense spin structures energy and informational fields are generated, together with solitons (Adamski 2011).

This continuous transformation of photons into phonons and the other way round, and also phonons into infons, serves as a basis for binary and qubit recording of information.

According to T. Stonier (1990) and M. Wnuk (1996), the world is filled with quantum information carriers referred to as infons.

- an infon is a photon with infinite wavelength

- a photon is an infon moving at the speed of light, so it does not have a momentum or rest mass; an infon is not energy, therefore – if speeds different than the speed of light exist, a quantum of energy is transformed into a quantum of information, i.e. an infon.

Stonier has put forward a hypothesis that photons are not fundamental particles, but are made up of two components: energy and information. An electromagnetic wave is composed of not just one, but two oscillation sets: (1) an oscillating electric field alternating with an oscillating magnetic field, and (2) regular changeability of information and energy. Assuming such a system exists, it can be concluded that an energon and an infon can continuously switch places during photon propagation and can perform the function of a quantum biocomputer.

When asked why our receptors respond to photons and do not respond to infons and tachions, Stonier says that children jumping rope are aware that it is not enough to jump at a specific frequency rate, you also have to make jump rope moves at a specific speed.

According to Hameroff, neural networks of the brain, together with synaptic connections are used for the transmission of information, just as is the case in traditional computers However, synapses and neurons have a complex structure and should be considered as biocomputers (nanoprocessors). They are distinguished in that they have a high capacity for parallel processing (parallel computing) in microfilaments, microtubules, together with all the cytoskeleton. Performance cells should be considered in the context of a dynamic, but not static. The cytoskeleton is capable of collective processing of information in a cell area at the molecular level, and acts as a computer cluster. In learning to understand the functioning of the cytoskeleton many models of clusters have been constructed, but they did not meet the expected results. Research shows that artificial neural networks are not able to accurately reproduce the features that occur in the brain. They are not able to accurately determine the hierarchy of information changing in a dynamic way the brain has no problem (Hameroff 1992).

Hameroff believes that microfilaments, microtubules, along the entire cytoskeleton contain modules that have an inherent nature to assess the hierarchy of information. The multi-level neural network in the brain combines modules and has a comprehensive system to recognize the hierarchy of information and the highest global level information is combined with an act of consciousness. The cytoskeletons in the cell has the ability to dynamically change the intracellular organization, by changing their network connectivity and information, but also for connections with neighboring cells. They also have the ability to reconfigure. The main attribute of the cytoskeletons is the plasticity of sharing their resources in a collective way, which is important in the resolution and processing information. Cytoskeleton signaling processes takes place in the form of the cytoskeletal filamentous structure, which is composed of sequences of information and data strings in a manner similar to a phonetic language. Microtubules function as channels that carry information strings and strings of data and at the same time protect information against interference and crosstalk (crostok).

A similar point of view is held by Richard Tadeusiewicz, who believes that at the single cell level extraordinarily complex regulatory processes take place, cyber and information. The elements involved in these processes are single molecules, the information carrier is a structural protein, fatty DNA, RNA, melanin. In medicine man is viewed through the prism of nineteenth-century biochemistry. The body is treated as an object, in which chemical processes take place, but information processes taking place there are disregarded. In the field of bioinformatics Tadeusiewicz proposed a new approach of automatic understanding of visual images, which takes into account the psychology of visual perception. Tadeusiewicz shows that in image analysis systems, in the sense of sight, we face data in the region of tens of millions of bits per second. This clogs up computer memory. The retina captures this item of information which is subject to immediate processing and reduction. It turns out that out of these many millions of bits of information only few bits per second at most reach the decision-making zone. Processing of information goes on beyond the level of our consciousness. We can claim that a certain automatism is at work here that can be recreated in artificial control systems. The processing of this item of information may be effected by means of biocomputers which are incorporated into the structure of biological cells (Tadeusiewicz 1989, 2004), (Tadeusiewicz, Fire 2006).

Quantum computing is a field of science on the border of theoretical computer science and quantum mechanics. It uses the unique properties of systems governed by the laws of quantum physics. Information technology shows that such phenomena as interference of wave functions, parallelism quantum superposition of states, quantum entanglement and coherence can be used to calculate the information in quantum computers (Nielsen, Chuang 2000), (Liberman, Minin, 1995), (Liber 2002)

The roles performed by bioplasma include also: integration, storage and management of information and energy processes in the human biological system.

According to Sedlak, bio plasma "is aware" of all that is going on inside it and around it. It provides information on the energy situation to the whole system as well as its parts. Bioplasma creates such a state of matter which is unity in diversity. It constitutes a material centre of life and the substrate of consciousness (Sedlak 1979: 265).

The other computer, which is located in the cell biological photoreceptors is a quantum bio-powered electric field resulting from the phenomenon of photoconductivity, piezoelectricity, pyroelectrics biological structures. This computer processes perceptual image and forwards it to bioplasma, which is entered in the content of solitons. It is then verified by bioplasma and compared with its own standard. Bioplasma corrects it, giving it a pattern of behaviour and way of thinking and of emotional responsiveness. It creates a unique specificity of the body, with his characteristic energy and full of information, structure of personality. Bioplasma determines the age, state of health, disease, thinking and human behaviour.

SUMMARY

Human life requires for its existence the continuous acquisition of chemical structures of electrons from the semiconductor, photons, phonons and electric fields, electromagnetic, gravitational, solitons and spin. The energy balance of life is not only kilocaloric chemical bonds, but also energy and information carried by electromagnetic waves, acoustic waves and solitons. Life in the quantum scale can be considered as linking elementary particles with wave phenomena in bioplasma, supported biochemically. The biochemical model explains the intricate mechanisms of mental life. With the current state of knowledge one cannot explain what transition is from inanimate matter to living matter. Where is the cognizant threshold and what is its essence, the role played by the biochemical processes in the consistency of the soma of consciousness, and vice versa? A similar problem is with the other mental processes. In summary, the nature of mental illness is not within the biochemical model of life and it is inexplicable on the basis of biochemical interactions; again it is far easier to describe it in the terms of quantum processes, cybernetic-information that is managed by bioplasma and by biocomputers.

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